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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re the Application of: Application No.: 10/828,465
Fultheim, Shai

Filed: 04/21/2004 Art Unit: 2128

For: Cluster Based Operating Examiner: Silver, David
System-Agnostic Virtual
Computing System

DECLARATION UNDER 37 CFR 1.132

Mail Stop Amendment
Commissioner for Patents
PO Box 1450
Alexandria, VA 22313-1450

I, the undersigned, Dan Eylon, hereby declare as follows:

1) I am an employee of ScaleMP, the assignee of the present patent application (hereinafter: the Application), in the capacity of Vice President for Research and Development (R&D). I am making this declaration in my capacity as an expert in the field of the Application, in order to clarify the meaning of loosely-defined terms that are used in the documents cited by the Examiner in the Official Action of June 5, 2008.

2) I have worked in research and development and R&D management in the fields of computer software and algorithms for twenty years. I have received the following academic degrees: B.Sc., Physics and Mathematics, Hebrew University of Jerusalem (1984), M.Sc., Physics, Tel Aviv University (1988), and Ph.D., Physics, Tel Aviv University (1994).

I am familiar with the field of the documents Bugnion, *Disco: Running Commodity Operating Systems on Scalable Multiprocessors*: (Bugnion (Disco)) and Bugnion, U.S. Patent No. 6,075,938 (Bugnion (Patent)) (collectively referred to herein as "the Bugnion documents"), cited by the Examiner against the claims of the Application. Through my experience in management in the computer field, I am aware of the capabilities of those ordinarily skilled in the art of virtual computing and multiprocessors, and in particular in the field of the Bugnion documents.

3) The claims of the Application are directed to a plurality of networked computers that share a virtual machine using multiple, respective virtual machine implementers, e.g., multiple virtual machine monitors.

4) In a previous declaration that I submitted in this case, I explained that the Bugnion documents disclose a single shared-memory multiprocessor, which may be partitioned into several virtual machines. As Bugnion states (Sec. 4), "Disco is a virtual machine monitor designed for the FLASH multiprocessor [17], a scalable cache-coherent multiprocessor."

5) Bugnion's virtual machines run over a single virtual machine monitor (VMM), which Bugnion calls "Disco." This architecture is shown in Fig. 1 of Bugnion, which I reproduced in my previous declaration. The Bugnion documents make no mention whatsoever of the use of multiple virtual machine implementers or monitors. On the contrary, Bugnion's VMM (indicated by the symbol "DISCO" in Fig. 1) always runs as a single entity directly above the hardware. In other words, the architecture shown by Bugnion in Fig. 1 contains only a single VMM running on a single multiprocessor

machine, possibly supporting multiple virtual machines. By contrast, the claims in the Application recite multiple virtual machine implementers on different computers sharing a virtual machine.

6) In rejecting the claims in the present Official Action, the Examiner apparently understood this difference, and therefore relied on a paragraph in the conclusion of the Bugnion article (Sec. 7) that refers to "more loosely coupled environments such as networks of workstations." The Examiner did not explain how this paragraph should be interpreted or why he considered this paragraph specifically to anticipate the claims in the Application. I will therefore attempt to elaborate on the meaning of this paragraph as it would have been understood by a person of ordinary skill in the art.

7) One possible meaning of the paragraph in question is that the Disco VMM could be modified to run on an entire network of workstations. As I explained in my previous declaration, Bugnion himself emphasizes that Disco relies on underlying cache coherency, which is very difficult to implement over a network. Bugnion does not teach how Disco should be modified to work in a networked environment, and the Examiner has not cited any other art that could supply the missing explanation. Even granting, however, that the Disco VMM could be made to run on a system of multiple networked workstations, the system would still consist of a single VMM, not multiple virtual machine implementers running on different machines as claimed in the Application.

8) An alternative possible meaning is that each workstation in the network runs its own, separate Disco VMM. In this case, a person of ordinary skill in the art would understand that each

workstation also runs its own virtual machine. These separate virtual machines could readily be used to support checkpointing and process migration functions among the workstations, as Bugnion suggests in Sec. 7. It is possible that each workstation could even run multiple virtual machines over its VMM. Bugnion does not make any suggestion, however, that the individual Disco VMMs on the different workstations could together share one virtual machine, as claimed in the Application.

9) Sharing a virtual machine among multiple virtual machine implementers on different computers, linked by a network, is a complex task, which was first made possible only by the means described in the Application and implemented in the software that was filed with the Application. As I have explained above, Bugnion does not teach or even suggest this sort of sharing, and even had he made such a suggestion, its implementation would have been beyond the capabilities of a person of ordinary skill in the art.

10) I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and conjecture are thought to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application of any patent issued thereon.

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